



**COUNTY OF LOUDOUN**  
**Department of Information Technology**  
**Five year Strategic Plan**  
**2016 – 2020**

# STRATEGIC PLAN 2015 – 2019<sup>i</sup>

## TABLE OF CONTENTS

<b>1. OVERVIEW</b>	<b>4</b>
<b>2. BACKGROUND</b>	<b>4</b>
<b>3. VISION</b>	<b>5</b>
<b>4. MISSION STATEMENT</b>	<b>5</b>
<b>5. GUIDING PRINCIPALS</b>	<b>5</b>
<b>6. IT GOVERNANCE</b>	<b>5</b>
6.1. Technology Steering Committee	6
6.2. Project Management Office	7
<b>7. FOCUS AREAS</b>	<b>8</b>
<b>8. FOCUS AREA I: MIGRATE CORE APPLICATIONS TO NEXT GENERATION SYSTEMS</b>	<b>10</b>
8.1. Goal: Transition to a Software Defined Data Center	10
8.2. Goal: Maintain Integrity of Core HR/Payroll Systems as Legacy Systems Are Transitioned	11
8.3. Goal: Ensure Seamless Upgrade of Public Safety Focused Applications	11
8.4. Goal: Continue to Implement Public Focused Applications	13
<b>9. FOCUS AREA II: GOVERNMENT WITHOUT WALLS</b>	<b>14</b>
9.1. Goal: Enhance the Usability and Functionality of Virtual Government	14
<b>10. FOCUS AREA III: SUCCESSION PLANNING</b>	<b>15</b>
10.1. Goal: Ensure Orderly Transition at DIT	15

<b>11.</b>	<b>FOCUS AREA IV: EXPAND COMMUNICATIONS SERVICES – INTERNAL AND EXTERNAL</b>	<b>18</b>
11.1.	Goal: Enhance LAN/WAN Network Services	18
11.2.	Goal: Ensure Continuity of Operations for the Public Safety Communications Systems	20
11.3.	Goal: Enhance Voice Service Delivery	21
11.4.	Goal: Facilitate Increased Broadband Access for Residents, Business, Government	21
<b>12.</b>	<b>FOCUS AREA V: ESTABLISH DISASTER RECOVERY AND CONTINUITY OF OPERATIONS</b>	<b>23</b>
12.1.	Goal: Prevent or Minimize Service Disruptions during Disasters	23

## Index of Tables

<a href="#">Table 6.1 IT Steering Committee Benefits</a>	7
Table 7.1 Strategic Plan Focus Areas	8
Table 12.1 Disaster Recovery Intervals	24

## Index of Figures

<a href="#">Figure 10-1 DIT Workforce Distribution</a>	15
Figure 10-2 Workforce Age Distribution Projection	16
Figure 11-1 Loudoun County Fiber Distribution System	19

## 1. Overview

The increasing pace of growth poses a key challenge for Loudoun County, creating new and changing development and economic drivers. Advances in technology have simultaneously redefined the role that information technology (IT) can play in achieving the County's mission. The Department of Information Technology (DIT) continues to address these new requirements for technological advancements in order to meet the needs of its citizens, business owners, and employees. In addition to managing existing operations effectively, DIT addresses many requests from County departments and business units for new technology projects.

The Department of Information Technology is charged with delivering quality and innovative information technology solutions that provide citizens, County departments, and business units with solid technical capabilities that ensure the integrity of the County's information, service efficiency and convenient access to appropriate information and services. DIT's fundamental goal is to provide superior services whether by enhancing IT systems and infrastructure, or by supporting innovative business processes.

### Technology Is More Than a Service, It Is an Investment

All organizations, regardless of size, complexity, or purpose, have long range plans that are strategic to the organization's long term success. **The purpose of this document is to define and articulate the critical information systems and services that are required in the next 5 years.** While delivery of information technology systems and services is centralized within the Loudoun County government and provided by the DIT, this plan looks at initiatives impacting all County departments and business units.

There is an element of risk in this plan as it outlines new initiatives and looks at technology upgrades. New technologies will be invented and existing technologies will evolve; the goal is to invest in technology based platforms, systems, and service delivery resources that will support the delivery of efficient services to the citizens and grow cost effectively over the long term.

## 2. Background

The Department of Information Technology provides information, office automation, and communications systems and services to the departments of the County government and Loudoun County Public Schools, the County's public safety agencies, volunteer firefighters, and emergency staff. Assistance and services are also provided to the County's incorporated towns and County staff. DIT's programs include:

- Infrastructure and Network Services – Infrastructure technical support services and disaster resilient data center operational support to County departments.

- Public Safety Support Services – Public safety communications and information systems in support of the safety and protection of all County citizens.
- Systems Development and Support Services – Support for major information systems utilized by the County and Schools.
- Technology Services – Administrative, policy, project management, security, and disaster recovery services.

### **3. Vision**

The Department of Information Technology’s vision is to serve as a trusted and collaborative advisor, recognized for our exceptional customer service, agility, and innovation in our delivery of effective and efficient enterprise information services and solutions that assist the County in maintaining excellence.

### **4. Mission Statement**

Deliver effective, reliable, innovative information technology solutions to the citizens while maximizing the effectiveness of county government.

### **5. Guiding Principals**

Our strategic IT direction is defined by guiding principles that will enable DIT to become a trusted partner to the County departments and business units. As such, DIT has established the following principles:

- Respond with the best technological solution to the needs of the community.
- Establish technology standards for all IT initiatives.
- Maximize the return on investment for all IT initiatives.
- Continually improve and streamline delivery of services

### **6. IT Governance**

Recognizing the importance of IT solutions to Loudoun County, DIT is engaged in an ongoing effort to establish, maintain, and support an IT governance strategy that ensures successful outcomes and more efficiently use the County’s IT resources. As the County’s IT portfolio evolves – new initiatives are added, new technology is introduced, and new policy is implemented - an effective IT governance strategy is needed to prioritize, manage, and maintain an effective and efficient IT portfolio across the County. The objectives of DIT’s IT governance strategy include:

- Ensuring continual alignment of IT strategy with the County’s mission and business goals.
- Adjudicating strategy and policy issues that affect the IT portfolio.
- Communicating views and discussing cross-organizational issues.
- Identifying opportunities and reducing costs of IT resources.

- Delivering satisfaction and benefits for County citizens, departments, and business units.

To enable County executives and DIT senior management in overseeing, prioritizing, and managing County-wide IT programs and projects, two governing bodies were instituted: the first is the Technology Steering Committee which is a County-level executive strategic oversight committee which is responsible for providing strategic oversight, coordination of IT issues across the County's business units, and ensuring that information resources support the County's strategic and business goals; the second is a Project Management Office (PMO) that provides centralized authority and instills a structured set of processes across all projects to ensure effective management, budgeting, procurement, operations of all IT projects within the County's IT portfolio.

### ***VI.1. Technology Steering Committee***

The County's Technology Steering Committee is an administrative body comprised of County senior Executives and representatives from the County's business units. The Committee establishes the IT priorities for the County and provides the strategic vision for the utilization of information technology. The Committee is responsible for overseeing selection, prioritizing, and approving IT projects according to the County's strategic goals and objectives.

Additionally, the Committee's objectives include improved coordination between County departments for the delivering technology resources to County citizens and employees. The Committee is comprised of representatives from County administration, departments, and business units including:

- County Administration
- Department of Information Technology
- Public Safety (FREMS, LCSO, Animal Control)
- Constitutional Officers including the Office of the Treasurer, Commissioner of the Revenue, the Commonwealth's Attorney's Office, and the Clerk of the Circuit Court
- Department of Management & Budget
- Human Resources
- Department of Financial Services
- Building & Development, Planning, Mapping
- Health & Human Services
- DGS/DTCI
- Parks, Recreation, and Community Services,
- Library Services

The Committee makes the final recommendation for prioritizing IT projects to be included in the County's IT portfolio. The Committee brings a number of benefits to the County by providing:

Table 6.1 IT Steering Committee Benefits

Committee Benefit	Description
Business Focus	The Committee’s strongest mandate is to review and align business solutions that may leverage technology.
Priority	The Committee will provide organizational priorities and overall strategy that will aid in resource decisions throughout the year especially during budget preparation for both operating and capital planning purposes.
Transparency	Other County departments will be able to see their Technology demands in the larger context of strategic plans, and at least understand (though maybe not agree with) the rationale behind decisions to proceed with one project over another.
Accountability	Technology projects, especially cross functional projects, will be based on Committee approval and priority and not just within the IT business unit.
Coordination	The Committee will provide organizational coordination for the activities of all technology related steering committees throughout the County. The existing technology related steering committees will become subcommittees of the Committee.

## VI.2. Project Management Office

The Project Management Office (PMO) is a management body which provides oversight for all IT projects, including reporting of progress, status and results. The PMO provides organizational-wide leadership, governance, and communication for the IT portfolio of projects, established under the authority of the Director. The role of the PMO is to ensure effective operation, management, budgeting, and procurement of all IT projects within the County’s IT portfolio. The PMO oversees the implementation of the project by providing governance decisions at key intervals throughout the life of the project lifecycle.

The PMO makes decisions on the suitability of a project to proceed beyond each review decision point into the next stage or phase of the project. The PMO is intended to complement the change control process and managed through various Enterprise Configuration and Control Boards (CCB), by ensuring early project alignment with DIT standards, and compatible integration into the DIT production environment. The PMO embraces the following goals:

- Provide governance and oversight for IT programs and projects within DIT
- Establish and ensure adherence to organization policy, standards, and guidelines.
- Establish and institutionalize a project management framework based on best practices and standards for all IT programs and projects.

- Facilitate sharing of knowledge, best practices, assets, and capabilities across DIT.

## 7. Focus Areas

These focus areas align with the County’s emphasis on modernization and operational excellence while supporting the unique opportunities and objectives of the County. This strategic plan identifies five focus areas needed to enhance and maintain service delivery to the residents and businesses of Loudoun County.

Multiple goals are identified for each focus area which further define specific achievements for each area. Initiatives that are significant to a targeted service delivery area -- but are less global in nature -- are not identified in this document.

*Table 7.1 Strategic Plan Focus Areas*

<b>Focus Area I</b>	<b>Migrate Core Applications to Next Generation Systems</b>
Goal	Transition to a Software Defined Data Center
	<ol style="list-style-type: none"> <li>1. Transition existing infrastructure to a fully virtualized infrastructure.</li> <li>2. Position the County to be able to take advantage of both private and hybrid clouds.</li> <li>3. Implement a comprehensive cloud management platform.</li> </ol>
Goal	Maintain Integrity HR/Payroll systems as Legacy Systems are Transitioned
	<ol style="list-style-type: none"> <li>1. Maintain legacy core HR/Payroll systems as they continue to be transitioned to new platforms.</li> <li>2. Procure and implement new core HR/Payroll systems by 2017.</li> <li>3. Retire legacy systems by 2019.</li> </ol>
Goal	Ensure Seamless Upgrade of Public Safety Focused Applications
	<ol style="list-style-type: none"> <li>1. Implement new public safety technology including upgrades to Computer Aided Dispatch (CAD) in 2016 including integration of GIS to provide better mapping and location solutions</li> <li>2. Finalize integration of Loudoun County NG911 compliant public safety systems with NOVA and COG as they become available</li> </ol>
Goal	Continue Implementation of Public Focused Applications
	<ol style="list-style-type: none"> <li>1. Implement a new Integrated Library System to provide the community with additional functionality and features.</li> <li>2. Implement a new Electronic Health Records system to make information available instantly and securely to authorized users; automate and streamline provider workflow.</li> </ol>
<b>Focus Area II</b>	<b>Government without Walls</b>
Goal	Enhance the Usability and Functionality of Virtual Government
	<ol style="list-style-type: none"> <li>1. Improve and expand online citizen services and access to data.</li> <li>2. Expand and enhance the network infrastructure to support future needs of tele-workers and mobile workers.</li> <li>3. Continue development of an “Always on ... available government”</li> </ol>
<b>Focus Area III</b>	<b>Resource Succession Planning</b>
Goal	Ensure Orderly Transition of Resources at DIT

	<ol style="list-style-type: none"> <li>1. Execute a resource succession plan that recognizes over 35% of DIT employees will be eligible for retirement during the next five years.</li> <li>2. Ensure that the departmental succession plan is consistent with County-wide succession planning.</li> <li>3. Ensure DIT goals align with the customer requirements for transition.</li> </ol>
<b>Focus Area IV</b>	<b>Expand Communications Services – Internal and External</b>
Goal	Enhance LAN/WAN Network Services
	<ol style="list-style-type: none"> <li>1. Migrate TLS circuits for remote sites from 10 Mbps to 100 Mbps.</li> <li>2. Increase internet capacity and bandwidth.</li> <li>3. Implement a leased fiber ring to lower network costs and expand capacity.</li> <li>4. Increase fault tolerance and reduce reliance on a single implementation</li> <li>5. Add a second point of presence at a separate County facility for National Capital Regional Network (NCRNET)</li> </ol>
Goal	Ensure 24x7 Operations of the Public Safety Communications Systems
	<ol style="list-style-type: none"> <li>1. Continue to refresh and upgrade the communications systems infrastructure bi-annually to ensure compliance with latest communications standards and technologies</li> <li>2. Continue to review public safety communications systems continuity of operations plans</li> </ol>
Goal	Enhance Voice Service Delivery
	<ol style="list-style-type: none"> <li>1. Converge voice and data networks where practical.</li> <li>2. Integrate voice and data systems with enhanced messaging and mobility.</li> </ol>
Goal	Facilitate Increased Access for Residents, Business, Government
	<ol style="list-style-type: none"> <li>1. Resolve broadband service problems for residents, business and government where possible.</li> <li>2. Streamline and/or reduce County review and regulatory requirements to enable faster/more efficient broadband expansion.</li> </ol>
<b>Focus Area V</b>	<b>Establish Disaster Resiliency and Continuity of Operations</b>
Goal	Prevent Or Minimize Service Disruptions During Disasters
	<ol style="list-style-type: none"> <li>1. Ensure availability of County network resources if a localized disaster occurs</li> <li>2. Establish means to recover critical Government applications with-in 24 hours</li> <li>3. Establish redundant systems to ensure continuity of Government operations</li> <li>4. Expand capital infrastructure and physical services of the backup ECC to allow for additional staffing and capability</li> </ol>

Focus Area I  
Migrate Core Applications to Next Generation Systems

## **8. Focus Area I: Migrate Core Applications to Next Generation Systems**

### ***VIII.1. Goal: Transition to a Software Defined Data Center***

#### **VIII.01.1. Current Infrastructure Environment**

The current operational environment incorporates IBM mainframe, mid-range Unix-based servers, and MS Windows servers hosted at the Loudoun County data center. This operational environment is used to house the County's core applications for both County Government and County Schools. The County has standardized on VMware ESXi hypervisor on IBM X Series servers with Intel Xeon processors utilizing blade center technology for their private cloud. The County is also utilizing public cloud services to host applications where appropriate.

#### **VIII.01.2. Future Needs**

Expectations to deliver applications and services quicker and at a lower cost will continue to increase. Transitioning beyond the limitations of the existing hardware-centric architecture will allow DIT to better meet those needs. Data center services will need to be more efficient and less expensive to manage. The ability to pro applications and services across platforms will provide the utmost flexibility in managing resources. Creating a seamless workload mobility across a hybrid environment will allow Loudoun County to utilize virtually any hardware, minimizing the need for specialized infrastructure. Using a comprehensive management tool will assist in automating and managing IT services across these heterogeneous clouds. The platform will orchestrate the changing dynamics of software-defined workloads.

#### **VIII.01.3. Business Value**

As business processes evolve and the growing demands of the County increase, systems and infrastructure have become more difficult and costly to maintain. The ability to extend virtualization beyond computing to network and storage, will make data center services more efficient and less expensive. Having the capability to provision applications and services on both private clouds and secure infrastructure-as-a-service (IaaS) platforms will provide the ability to manage resources and reduce operational costs.

## ***VIII.2. Goal: Maintain Integrity of Core HR/Payroll Systems as Legacy Systems Are Transitioned***

### **VIII.02.1. Current Environment**

The County's core HR/Payroll systems were acquired over twenty years ago and are based on functional requirements and a technological architecture that satisfied the County's business needs and budgetary requirements at the time of acquisition. Some of these systems are shared with the Loudoun County Public Schools, while others serve only County government agencies. In all cases, the core systems have been augmented with both purchased and County developed add-on systems. Add on programs, and manual processes were developed to maintain functionality and usefulness in the core systems.

### **VIII.02.2. Current Limitations**

Over the last few years, DIT has become increasingly concerned that these systems may not possess the robust qualities necessary to maintain efficient operations in the face of ever increasing business requirements and workloads.

Usability of the current systems have become antiquated compared with the automated features and facilities offered by newer technologies. Generally, many of the systems are now unsupported by the vendors who originally developed the solution - DIT was supporting the software and equipment on a best effort basis. The technical architecture is based on legacy standards and are not suited to new commercial off-the-shelf technologies (COTs) applications; systems are no longer supported by vendors.

### **VIII.02.3. Business Value**

The systems have supported the County's operational needs throughout their lifecycle. As business processes evolve and workloads increase to support the growing demands of the County, legacy systems have become more difficult and costly to maintain. In order to enhance and streamline current operations and reduce costs, the County enlisted assistance in determining the best method to support current and future business and operational requirements.

## ***VIII.3. Goal: Ensure Seamless Upgrade of Public Safety Focused Applications***

### **VIII.03.1. Current Environment**

Loudoun County's public safety departments include the Sheriff's Office, the Department of Fire, Rescue and Emergency Management, and the Department of Animal Services' Animal Control Division. In addition, several of Loudoun County's incorporated towns have their own police departments.

Many of the public safety applications and services are undergoing upgrades to include new public safety technologies. The existing Computer Aided Dispatch (CAD) application is being upgraded in 2016 and will include integration of a graphical information system (GIS) capability to provide

better mapping and location solutions to public safety departments such as the Department of Fire, Rescue, and Emergency Management.

Additionally, public safety offices currently utilize existing narrowband, circuit switched 9-1-1 networks which carry only voice and very limited data. The current focus is to provide enhancements to the communications infrastructure in order to provide higher VoIP utilization resulting in higher availability and redundancy along with lower maintenance and costs.

### **VIII.03.2. Future Needs**

Next Generation 9-1-1 (NG9-1-1) networks will be designed to replace the existing narrowband, circuit switched 9-1-1 networks which carry only voice and very limited data. A highly standardized system is essential and critical to seamlessly support communications and data transfer across county, state, and international borders, and across the multitude of emergency response professions and agencies. NG 9-1-1 is a system comprised of hardware, software, data and operational policies and procedures which:

- Provide standardized interfaces from call and message services.
- Process all types of emergency calls including non-voice (multi-media) messages.
- Acquire and integrate additional data useful to call routing and handling.
- Deliver the calls/messages and data to the appropriate PSAPs and other appropriate emergency entities.
- Support data and communications needs for coordinated incident response and management.
- Provide a secure environment for emergency communications.

### **VIII.03.3. Business Value**

Moving to NG9-1-1 will allow the County to provide integration and the ability to communicate across public safety systems not only within the County but also with other public safety systems across the region. The Public Safety organizations within the County will have a greater ability to manage responses and threats to emergencies across the region. As such, NG9-1-1 will be based on the latest state of the art technology incorporating the following frameworks and standards:

- Emergency Services IP Network (ESInet) which uses broadband, packet switched technology capable of carrying voice plus large amounts of varying types of data using Internet Protocols and standards.
- International Standards Compliant IP Functions which incorporate IP protocol standards as developed by the IP Functions Internet Engineering Task Force (IETF) and incorporate NENA applied standards from IETF and other development organizations incorporating specific NG9-1-1 requirements.
- Databases and Data Management Systems specific to NG9-1-1 requirements and data content.
- Extensive hardware and software security methods which address NG9-1-1 requirements and replicate the privacy and reliability inherent in E9-1-1 services.

- Systems operations which improve human processes and procedures needed to control and monitor the functionality and effectiveness of the NG9-1-1 systems and services.

#### **VIII.4. Goal: Continue to Implement Public Focused Applications**

##### **VIII.04.1. Current Environment**

As with other applications, usability of the current systems are becoming antiquated compared with the automated features and facilities offered by newer technologies. The primary public focused applications are included in the Health and Welfare and the Parks, Recreation, and Culture organizations.

The Horizon library system was replaced in early 2016 with The Library Corporation's Carl\*X system. This new library system provides many enhancements including simplified usability, many more resources for Loudoun County school children, and additional features not provided by the previous library system. The library system is used across all Loudoun County library branches and the Leesburg city library branches.

The current mental health applications which support the County's mental health programs provide limited access to County information and automation. As with many evolving healthcare standards with the current administration, the County will continue to upgrade and provide enhancements to the applications.

##### **VIII.04.2. Future Needs**

As the focus on community service continues to grow, the existing County's public focused applications are continually being challenged to provide new services. Improvements in utilization and service provisioning are ongoing thus necessitating technology upgrades and security enhancements. In order to support the County's role in providing health and mental health services to its residents, the County will be upgrading its current system to support a new electronic health records system to enable access to information instantly and securely to authorized users; the ability to automate and streamline provider workflow.

Focus Area II  
Government without walls

**9. Focus Area II: Government without Walls**

***IX.1. Goal: Enhance the Usability and Functionality of Virtual Government***

**IX.01.1. Current Environment**

Nationally, 50% of homes have a broadband connection. In Loudoun County 86% capability have a broadband connection and 93% of County residents have access to the internet from their home. Loudoun residents are technology savvy and will continue to seek information and services on line. The ability to access information and services from mobile devices continue to increase dramatically.

**IX.01.2. Future Needs**

As the need to access timely information and services increases, network and operational support services will require additional resources to support the residents and County. The ability to provide access to timely, standardized, and relevant data, information, knowledge, and applications will continue to drive operational support and resource requirements. Questions that need to be continually addressed include:

- How do residents and businesses currently interact with County government?
- How do residents and County government gain information about their community?
- How will residents want to interact with County government to gain information?
- How can technology support the County provide better services to the residents and businesses of the County?

Focus Area III  
Succession Planning

**10. Focus Area III: Succession Planning**

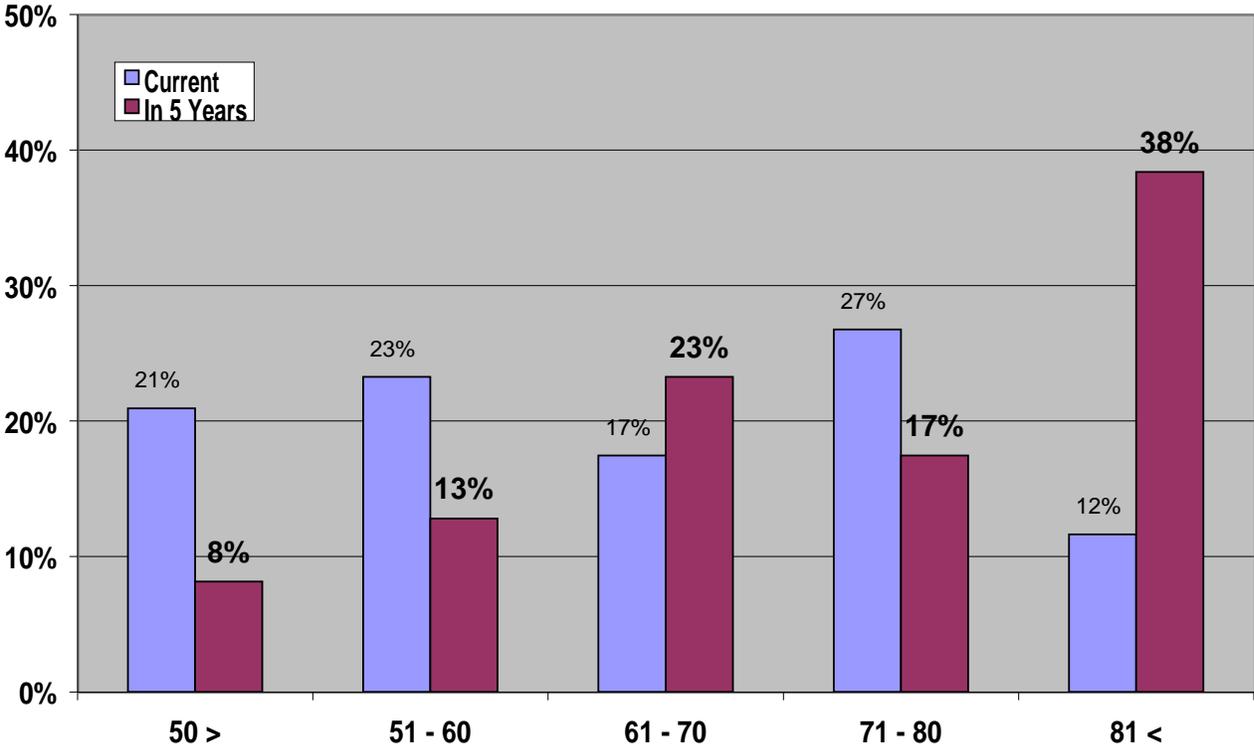
**X.1. Goal: Ensure Orderly Transition at DIT**

**X.01.1. Current Environment**

As the chart below depicts, in 2013, 38% of DIT employees will be eligible for retirement within 5 years. The need was to work with HR and with other departments to transition the existing knowledge base to new employees and ensure continuity of operations.

*Figure 10-1 DIT Workforce Distribution*

Over the next 5 years -- 38% of DIT employees will be eligible for retirement  
81 years of service (Age + time) in VRS.

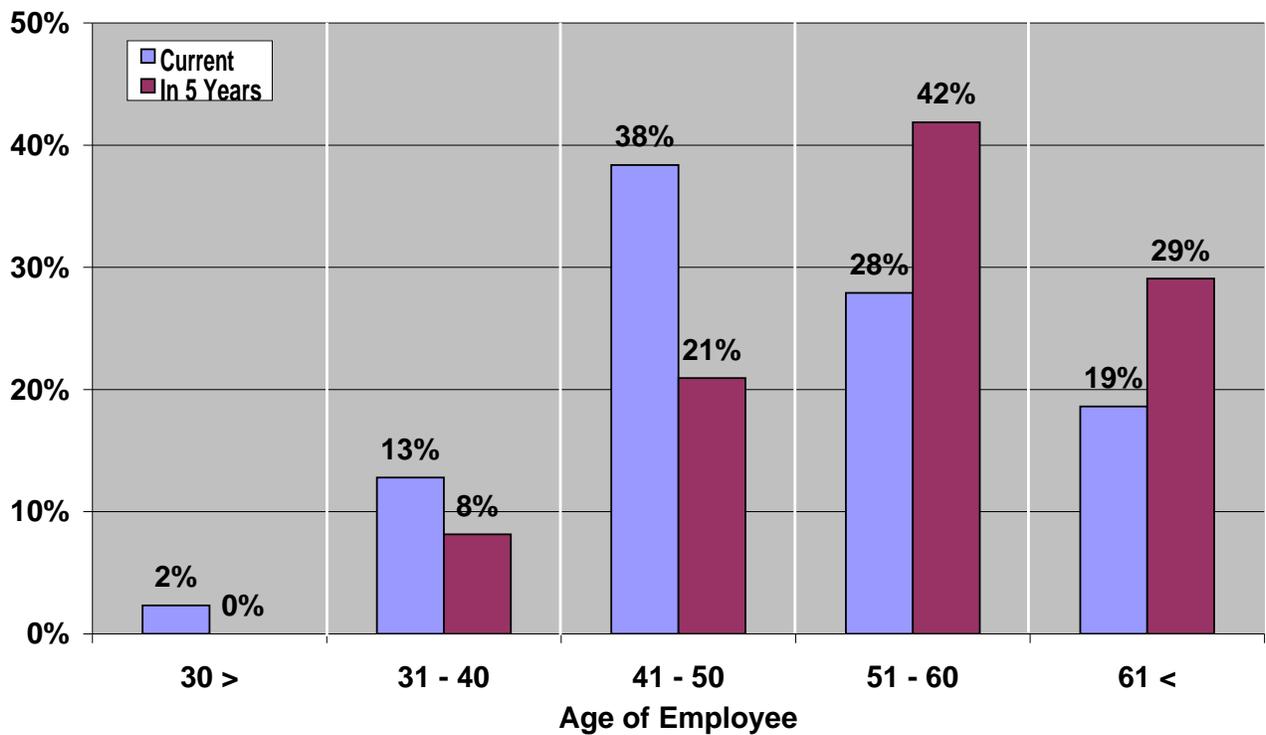


### X.01.2. Graying of IT

In a technology industry, retaining and hiring employees with knowledge of new skills and new systems is critical to service delivery. DIT has hired experienced employees to manage and maintain legacy systems. In 2016, DIT will have a few employees younger than 30 and only 8% of its employees will be under the age of 40 in 5 years. 47% of employees are over the age of 51 -- in 5 years 71% of employees will be over the age of 51.

Figure 10-2 Workforce Age Distribution Projection

**In 5 years -- 29% of DIT employees will be over the age of 61**



### X.01.3. Current Initiatives

In 2014 DIT began to address the staffing issues by developing entry level technician program. The program recruits technical staff with no or minimal experience and provides them with training across multiple IT disciplines. These entry level positions have allowed DIT to develop a succession plan to recruit junior level technicians to address the department's large number of employees who are within 10 years of retirement.

#### **X.01.4. Future Needs**

Cross knowledge transfer is imperative in order to retain organizational knowledge and skills for the County’s business processes and IT that supports these processes. Succession planning is essential to ensure that legacy systems are supported until these legacy systems are retired or decommissioned. As the organization ages and matures, new staff with a longer retirement horizon is needed to replenish staff nearing retirement.

## **11. Focus Area IV: Expand Communications Services – Internal and External**

### ***XI.1. Goal: Enhance LAN/WAN Network Services***

#### **XI.01.1. Current LAN/WAN Environment**

Loudoun’s owned network is comprised of a 15 mile fiber network in Leesburg connecting the major government buildings. Connectivity to other facilities has been accomplished by leasing circuits from Verizon. Implementation of a leased fiber ring has provided the infrastructure for highly available, high-speed WAN connectivity for core sites. This redundant ring extends Loudoun County’s WAN in the southeast quadrant of the county and eliminates the need and expense of the inter-LATA circuit.

A County owned meshed fiber backbone connects the majority of the County locations in Leesburg to the DIT Datacenter. The Wide Area Network (WAN) is comprised of 10/100/1000 Mbps Verizon Transparent LAN Services (TLS) circuits. The County utilizes a mix of FIOS and Comcast ISP services for smaller branch offices that connect via IPsec VPN.

Access to the Internet is provided by two circuits geographically separated for redundancy: a 400Mbps Verizon circuit located at the DIT Network Operating Center (NOC) and a 400Mbps Novoc/Cogent circuit at the main Government Center building in downtown Leesburg.

#### **XI.01.2. Future Needs**

As additional county facilities are established and the need to share information and online services increases, the county’s network will require expansion and increased bandwidth. Migrating from 10 Mbps to 100 Mbps TLS circuits will improve access to data and online services for remote sites. In addition, increasing the Internet bandwidth will provide improved access times to external systems/information as well as better access for citizens and teleworkers to Loudoun County internally-hosted services. The leased fiber ring will also be utilized to connect Loudoun County’s core sites via two 10 Gbps circuits and provide point to point redundant connectivity between the primary and backup Emergency Communication Centers via two 1 Gbps circuits.

### **XI.01.3. Interoperability**

Northern Virginia is made up of the cities of Alexandria, Fairfax, Falls Church, Manassas, Manassas Park; and the counties of Arlington, Fairfax, Loudoun, and Prince William; This area is a part of the Baltimore Washington Metro area, the 4<sup>th</sup> largest metro area in the US with a population of approximately 2,000,000 people. Northern Virginia also comprises Region 7 of the Regional Preparedness Advisory Committees.

Jurisdictions associated with the Council on Government (COG) have interconnected their networks which was accomplished via the National Capital Region Network – NCRNet. Loudoun County established fiber connectivity to the NCRNet. To enhance the reliability, availability and fault-tolerance of the NCRNet, DIT will look to add a second NCRNet point of presence at a separate facility on the County network.

### **XI.01.4. Business Value of an Enhanced LAN/WAN**

As the needs of the County and its residents continue to grow, improvements to the existing LAN/WAN infrastructure will be required. Improvements include:

- Increased performance, scalability and stability resulting in improved accessibility and reliability.
- Network redundancy and a more robust disaster recovery strategy to ensure continued operations for the County.
- Reduced ongoing operational costs such as the elimination of ongoing expenses of leased Inter-LATA circuit – estimated \$1.1 Million over 10 years.

## ***XI.2. Goal: Ensure Continuity of Operations for the Public Safety Communications Systems***

### **XI.02.1. Current Communications Environment**

The current radio system is used by the Loudoun County Sheriff's office, Loudoun County Fire and Rescue and Emergency Services and was recently upgraded in 2015. These upgrades involve enhancements to the existing infrastructure of the Public Safety Radio system, mobile, and portable subscriber units. Currently, the radio system infrastructure is on a bi-annual infrastructure software and firmware replacement.

### **XI.02.2. Future Needs**

DIT plans on replacing the microwave infrastructure to support the public radio system in 2019. In addition the mobile subscriber units are also scheduled for replacement in 2019.

### ***XI.3. Goal: Enhance Voice Service Delivery***

#### **XI.03.1. Current Voice Environment**

The County currently utilizes a hybrid time division multiplexing (TDM) and voice over IP (VoIP) Avaya telephone system installed in all County buildings and offices. This leased state-of-the-art phone system provides scalability and a lower cost of ownership for the service by allowing use of lower cost data networks for communication. Integration of voice and data systems provides for enhanced messaging and mobility.

#### **XI.03.2. Future Needs**

Continuing to converge voice and data networks will reduce connectivity duplication and allow for superior standardization and configuration of networks and resources. Migrating from 10 Mbps to 100 Mbps circuits at remote sites will allow for migration to VOIP and improve delivery of voice services.

#### **XI.03.3. Business Value of an Enhanced Voice Services**

To support the business needs and operations of the County in addition to finding ways to reduce overall costs and improve operations, the County will continue to provide enhancements to voice and data services. These enhancements include:

- Improved voice quality.
- Enhanced message delivery with additional message options.
- Improved availability and fault-tolerance for the voice services.
- Further standardization of voice and communications technology.
- Expanded reporting capabilities for communications.

### ***XI.4. Goal: Facilitate Increased Broadband Access for Residents, Business, Government***

According to the Loudoun County Survey of Residents, performed by the Center for Survey Research, Weldon Cooper Center for Public Service, of the University of Virginia, over 95% of all the residents of Loudoun County have internet access at their homes. Roughly 98% of the County's residents have cell phone service at their homes, although roughly 90% report that their service is only "somewhat reliable" only 44.6% of rural residents rating their carrying capacity for cell phone services below "very good".

Rounded estimates from the U.S. Census Bureau's American Community Survey, Time Series, estimates that roughly 40% of Loudoun County residents are under the age of 24, 45% are between the ages of 25 to 54, and 17% ages 55 and above, with nearly 9 in 10 households with school-aged children. These statistics represent an ever growing population that relies heavily on broadband connectivity for their internet browsing, educational research, gaming, and as a video entertainment source. This group is more likely to access the Internet via a "wireless" broadband

solution, as opposed to a “wired” service, where both services are equally needed not only for convenience, but also for speed and content delivery methods.

The requirement for more reliable Internet access has increased not only among the school-aged residents of the County, but also from telecommuters, and Home Based businesses. From the above mentioned survey, roughly 36.8% of County residents telecommute, and roughly 19.4% of County residents have home based businesses. These expanding requirements, combined with the educational research requirements, and the developing requirements for tele-health, tele-medicine, remote security services, etc., requires a broadband solution that can carry more traffic, faster, with more reliability and less expense.

The office of the Broadband and Cable TV Administrator has been focusing on expanding the Broadband footprint availability throughout the County. While the non-rural portions of the County are very well serviced by Broadband providers, roughly 30% of rural residents claim that they do not access the internet because there is no available service to choose from, other than satellite services. That equates to roughly 30,000 residents that would like to access the Internet via a reliable provider, but either are not serviced by one, or the ones that are available are not very reliable.

Efforts are being made to expand the broadband footprint deeper into the rural portions of Loudoun County by identifying, and implementing, developing technologies (such as RFoG) that could make expansion of existing “wired” services providers’ networks more cost effective, resulting in a solution that could accomplish these expansion requirements. This research effort to identify developing technologies does not stop at “wired” solutions, but also looks to technologies such as OTT (over-the-top digital streaming video) solutions, giga-bit Ethernet, G.fast DSL, and expanded/upgraded Wireless Broadband solutions to the repertoire of solutions available to the rural market.

The solutions being researched are not only limited to existing service providers within Loudoun County, but are also trying to attract new sources of services from smaller providers that have utilized the Federal grant/loan programs available to provide Broadband services to rural communities throughout the state. Some of these providers currently have fiber optic backhaul connectivity into the various Internet portals in Northern Virginia, and could potentially become rural service providers given the correct business environment and business case models. To that end, Loudoun County has embarked on identifying, and correcting, the zoning requirements that may pose a roadblock to this expansion effort. The County has also embarked on identifying various County owned property’s that could be used as connectivity locations for the co-location of infrastructure for these expansion efforts.

Focus Area V  
Establish Disaster Recovery and Continuity of Operations

## 12. Focus Area V: Establish Disaster Recovery and Continuity of Operations

### ***XII.1. Goal: Prevent or Minimize Service Disruptions during Disasters***

#### **XII.01.1. Current Environment**

An IT Disaster Recovery planning initiative was undertaken for Loudoun County which was incorporated in the County's Continuity of Operations Plans (COOP). These plans rely heavily upon the fast recovery of IT services in order to ensure continued operations of the County's business and services due to service disruptions and system failures. This disaster recovery initiative sought to achieve the following business goals:

- Develop recovery time objectives for key applications and services from the departmental perspective.
- Assess current ability to meet the defined recovery time objectives.
- Develop high-level recovery strategies to enable the county to meet the defined recovery time objectives.
- Develop estimated costs for implementing the defined recovery strategy.

This initiative focused on identification of key technology services, business applications and related technology infrastructure that supports departments within Loudoun County. Information about these applications and services along with draft Recovery Time Objectives (RTO) were then reviewed with the Emergency Management Operations Committee (EMOC). The EMOC then adjusted the draft RTOs based on the respective departmental business needs. These adjusted RTOs as reflected in Section 2 – Target Recovery Time Objectives, were then utilized as the basis for developing the high-level recovery strategies and related costs as defined in this document.

#### **XII.01.2. Plan Scope and Assumptions**

The scope of this initiative focused specifically on the primary data center that DIT manages. Approximately, 95% of all County applications and technology services rely upon this site for operation. This planning project focused on the assumption that a ***localized disaster*** within the data center (such as a fire) rendered the main data center site inoperable for an extended period of time.

#### **XII.01.3. Target Recovery Time Objectives**

Recovery Time Objectives (RTO) were developed in conjunction with the Emergency Operations Management Committee. These RTOs were utilized as the basis for the recovery strategy plan discussed in this document. The following reflects the recovery tiers for applications and

technology services. Each application or service was placed into a tier based upon the business owner’s perspective regarding the need for the application or service. The following is a summary of the recovery tiers that were defined for Loudoun County.

*Table 12.1 Disaster Recovery Intervals*

<b>Tier</b>	<b>Disaster Recovery Interval</b>
Tier 0	Applications/Services in this tier have a requirement of “real-time”. The goal is no outages of this service in the event of a disaster.
Tier I	Applications/Services in this tier will be operational within 24 hours.
Tier II	Applications/Services in this tier will be operational within 1 to 3 days.
Tier III	Applications/Services in this tier will be operational within 4 to 7 days.
Tier IV	Applications/Services in this tier will be operational within 8 to 14 days.
Tier V	Applications/Services in this tier will be operational within 15 to 31 days.

### **XII.01.4.Future Initiatives**

Implementation of the Disaster Recovery plan has been segmented into three phases that require funding to complete. Funding for this initiative will be an issue as it is necessary to pay for these steps in a best effort/available fund manner.

*Phase 1* - General recovery and network service recovery strategy for site and technology co-location, diversification of data communications architecture, core technology services, internet connectivity VPN access, and hardware replacement.

*Phase 2* - Completion of public safety redundancy efforts, application restoration

*Phase 3* - Completion of enterprise virtualization platform, mainframe repurposing, and possible mainframe warm site efforts.

### **XII.01.5.Business Value**

This goal supports the County’s Continuity of Operations Plans by allowing for continuity or recovery of business services in the face of a catastrophic event. The County has an increased need for viable continuity of operations capabilities and plans that enable the County to continue its essential functions across a spectrum of emergencies or events. These conditions have increased the importance of having continuity programs that ensure continuity of essential County functions.

---

<sup>i</sup> The 2015 – 2019 Strategic Plan is currently under a major revision due to changes in its development processes.